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These are to certify, that I have this day been present at the trial of Lieut. Rodger's new syphon, on board of His Majesty's ship Impregnable. I think this admirable invention well calculated for watering His Majesty's ships: it will save much labour, which is of the greatest consequence in fitting out ships of war, where the men are much wanted in rigging, victualling, and storing the ships for sea. The syphon will be very useful in newly commissioned ships, where they have but few men, and those required for other work. It appears it will take twelve able men three hours' hard work to pump out a tank of fifty tons. The syphon will discharge the same quantity of water in less than two hours without any men.

(Signed) JOHN GAZE,  
November 30, 1818. Master of H.M.S. Impregnable.

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No. II.

MAKE-SHIFT ANCHOR.

*The LARGE SILVER MEDAL was presented to W. RODGER, Esq., Lieutenant R.N., for his Make-shift Anchor; a Model of which has been placed in the Society's Repository.*

SIR, 1, Upper Gloucester Place, King's Road,  
Chelsea, April 8, 1829.

HAVING several years ago invented a substitute for an anchor, which might probably before this have been of some service to the public had it been generally known, I have now the pleasure of transmitting a model thereof

(on a scale of an inch to the foot for one of about 27 cwt.), which I beg leave to submit to the consideration of the Society for the Encouragement of Arts, &c. ; and I would fain hope, that should it meet with their approbation, it may still be the means of saving much valuable property and many human lives, which, I trust, will be considered of still greater value. How far it has already answered the purpose may at once be ascertained by a reference to the accompanying report of a trial of nearly six weeks, which took place on board His Majesty's ship *Hind* in the year 1819; and how much further it may be rendered useful to the merchant and mariner I am most willing to leave to the decision of the Society. All that I beg to impress on them is, that it is only intended as a temporary or make-shift anchor, to be used in the event of losing all the proper anchors.

They will, therefore, perceive that it is not my wish to place it in competition with the established anchor, but to have it compared with what has hitherto been most generally used as a substitute for one,—namely, *a gun*, which has no tendency to enter the ground, and therefore can oppose but little resistance to the impulse of the ship. The make-shift, on the contrary, the moment that it begins to drag, enters the ground, and possesses as much resisting surface as the common anchor. It has, moreover, the property of holding even more than the common anchor in muddy ground, and this arises from the considerable surface which it covers, and which, by the pressure of the superincumbent fluid, together with that of the atmosphere, causes it to hold very tenaciously; as was exemplified in Leith Roads and at Spithead, by the great power which was required to break it out of the ground. With regard to the construction, it will be per-

ceived that it may be made of five, six, or seven pigs of iron, cast in the form represented by the model, and connected by means of six bolts, with the addition of a block of elm, which increases the power of resistance, and, in consequence of its comparative lightness, tends to make the anchor fall the right way. The resistance of the buoy, if streamered in time, and if the ship be permitted to drift to leeward of it till the buoy-rope becomes tight from the anchor before it is let go, will likewise have a great tendency to keep the block of elm uppermost; as the buoy will in that case be dragged under water, which has the same effect as if the anchor was lowered down by the buoy-rope, which, in fact, may easily be done by taking a turn with it, and keeping it fast till the anchor reaches the bottom.

This precaution, however, I conceive to be quite unnecessary, if the ship has got good stern way when the anchor is let go. Indeed, I never knew it to fall awry. Should the Society be desirous of knowing the expense of such an anchor, the following particulars will enable them to make their own estimate:—

	Cwt.	qrs.	lbs.
Six pigs of cast-iron, weighing .....	25	0	23
Six bolts, washers, and forelocks .....	1	2	3
Weight of anchor.....	26	2	26
Triangular chain and ring .....	0	3	11
Cable ring, chain, and shackle .....	1	0	7
Total weight of iron.....	28	2	16
Block of elm, covered with plate iron ....	3	3	5
	32	1	21

The chain is considered as a part of the cable, and

therefore its weight should not be included with that of the anchor.

For further particulars I beg leave to refer the Society to my letter of the 5th of May, 1819, addressed to the Secretary of the Admiralty, of which I have herewith the honour to transmit a copy; and should any further information be required, I shall have much pleasure in waiting on the Committee and explaining my plan more fully.

I am, Sir, &c. &c.

A. AIKIN, Esq.  
Secretary, &c. &c.

WILLIAM RODGER,  
Lieut. R.N.

*References to the Engraving. Plate IX.*

Fig. 2, a side view; fig. 3, a top view. The anchor is made with four plain pigs of iron ballast *a a a a*. Figs. 4, 5, and 6, are top, side, and end views of one pig; and, with two others *b b*, having two projections *c c* from the top, as shewn separate in figs. 7 and 8: they are all cast with the front wedge-shaped ends *d* bending downwards, and with two holes *e e* to receive the bolts *f f*, which hold them together; *g g* two bolts, which pass through the ears *c c* to connect the back and front chains *h* and *i*; *j j* an elm block, dove-tailed to slide in between the ears *c c c c*, where it is fixed by two bolts *k k*. Fig. 9, the block separate; *l*, swivels for the buoy-rope; *m*, cable ring.

SIR,

*Admiralty Office, July 5, 1819.*

HAVING laid before my Lords Commissioners of the Admiralty your letter of the 3d instant, requesting that

you may be allowed to go on board the Wye for a few weeks to observe the effect of the “make-shift anchor of your invention, intended to be tried on board that ship;” I have their Lordships’ commands to acquaint you that they approve thereof, and have ordered the Wye to call at Spithead for the anchor, if not inconvenient; and have further given directions for your being borne in the Wye as supernumerary for victuals only.

I am, Sir, &c. &c.

Lieut. RODGER,  
7, King Street, Portsea.

JOHN BARROW.

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*His Majesty’s Sloop Hind, Spithead,*

SIR,

October 18, 1819.

WITH reference to your letter of the 27th of August last, desiring me to receive on board His Majesty’s sloop under my command, for trial, the make-shift anchor invented by Lieutenant Rodger, I have the honour to report to you, that the said anchor was received on board the Hind on the 8th ult., and has undergone the following trial, viz.—

Sept. 9.—5<sup>h</sup> 30<sup>m</sup> P.M. Anchored (with chain cable) in seventeen fathoms off Beachy Head; calm weather; veered to half a cable.—10 P.M. Light breezes, weighed.

Sept. 10.—7<sup>h</sup> 30<sup>m</sup> A.M. Light airs; anchored (with chain cable) off Dungeness, in sixteen fathoms; veered to half a cable.—11<sup>h</sup> 30<sup>m</sup> A.M. Weighed.

Sept. 11.—8 A.M. Wind N.E. by N. Fresh breezes, with a swell from N.E.; anchored in a fair way in the Downs in 11 fathoms, gravel bottom (with chain cable); veered to half a cable and furled sails.—P.M. Fresh breezes; 40 minutes after noon weighed.

Sept. 13, P.M. Moderate breezes.—1<sup>h</sup> 50<sup>m</sup>. Anchored (with chain cable) at the Little Nore, muddy bottom; veered to half a cable.—6<sup>h</sup> 30<sup>m</sup> P.M. Weighed.

8<sup>h</sup> 30<sup>m</sup> P.M.—Anchored at Great Nore (with chain cable) in seven fathoms; veered to half a cable and furled sails.—Midnight. Fresh breezes.

Sept. 14.—6<sup>h</sup> 30<sup>m</sup> A.M. Weighed.—5<sup>h</sup> 40<sup>m</sup> P.M. Moderate breezes; anchored in five fathoms (with chain cable) in Queen's Channel; furled sails, and veered to half a cable.—Midnight. Light breezes.

Sept. 15.—8<sup>h</sup> 30<sup>m</sup> A.M. Weighed.—7<sup>h</sup> 30<sup>m</sup> P.M. Moderate and squally; anchored in ten fathoms in the Downs (with chain cable); veered to half a cable and furled sails.—Midnight. Light airs.

Sept. 16.—1<sup>h</sup> 45<sup>m</sup> A.M. Fresh breezes from S.W.; weighed.—9<sup>h</sup> 40<sup>m</sup> P.M. Fresh breezes; anchored (with hempen cable) in six fathoms at Spithead; furled sails, and veered to half a cable.—Midnight. Moderate breezes.

Sept. 17.—Moderate breezes; single anchor at Spithead.

Sept. 18.—Moderate breezes.—5<sup>h</sup> 40<sup>m</sup> P.M. Hove short with the intention of getting under way; previous to making sail stranded the messenger; made sail to assist in breaking ground; tide flowing.—6<sup>h</sup> 10<sup>m</sup> P.M. Started the anchor, hove up, and found that it had been completely buried in the mud.

Sept. 19.—3 P.M. Fresh breezes, and squally; wind N.N.E.; anchored in Walmer Road (with chain cable) in eleven fathoms, South Foreland W.  $\frac{1}{2}$  S.; furled sails, veered to half a cable.—8 P.M. Strong breezes and squally.—9 P.M. The weather-tide made.—10 P.M. Observed the ship driving to windward, which can only be accounted for by supposing her to have gone *directly* over

the anchor, and thereby to have *upset* it, as she rode out the whole of the lee tide, blowing fresh with a considerable swell; hove up and came to with the *best bower* in the Downs in ten fathoms, South Foreland S.W. by W., Sandown Castle N.N.W.

Sept. 26. — Moderate breezes; 5, anchored (with hempen cable) in six fathoms, furled sails, and moored ship with a cable each way in Leith Roads, make-shift to N.W.; wind W.N.W.

Sept. 27 and 28. — Fresh breezes from the westward.

Sept. 29. — Moderate breezes. — 5 A.M. Unmoored; found considerable difficulty in breaking make-shift anchor out of the ground, having forty men at the capstan. — 8 A.M. Weighed the best bower with only twenty-five men at the capstan.

October 5. — Fresh breezes from N.N.W. Noon, shortened sail, tide running to the westward, and the ship going about three knots, when the make-shift anchor, with the hempen cable, was let go at Spithead in six fathoms, which brought her up with a range of thirty fathoms cable. — 3 P.M. Moored ship, a cable each way, make-shift to N.E., from which time she has rode as well as if moored with the established anchors, although there have been fresh breezes both from the eastward and westward.

In making this report, it may be proper to state, that the weight of the established bower anchor of the *Hind* exceeds that of the make-shift by about five cwt.; the former weighing 36 cwt. exclusive of the stock, which may be reckoned at about 9 or 10 cwt., and the latter weighing only  $30\frac{1}{2}$  cwt.

From the foregoing statement it will be perceived that the make-shift anchor has only dragged in one instance;



*A STATEMENT, shewing where His Majesty's Sloop Hind, under my command  
Lieutenant WILLIAM RODGER, between 27th Februa*

ANCHORED.						WEIGHED.		
Day of the Month.	Hour.	Where.	Depth of Water in Fathoms.	Description of Bottom.	Cable veered to.	Day of the Month.	Hour.	Drove or not.
Feb. 27	H. M. 2 50 P.M.	Cowes Roads.....	7½	Gravel.....	1	Mar. 1	H. M. 1 15 P.M.	Not.
Mar. 1	3 30 P.M.	South Yarmouth Roads	7½	Gravel.....	½	... 2	9 0 A.M.	Not.
... 2	3 45 P.M.	Off South Yarmouth ...	10	Sand and Clay..	1	... 3	8 15 A.M.	Not.
... 3	10 15 A.M.	Cowes Roads.....	7	Coarse Sand.....	1	... 5	10 15 A.M.	Not.
... 5	6 0 P.M.	Weymouth Roads.....	9½	Sand.....	½	... 6	5 40 A.M.	Not.
... 8	2 0 P.M.	Cowes Roads.....	10	Coarse Sand.....	1	... 11	5 30 P.M.	Not.
... 11	7 30 P.M.	Off South Yarmouth ...	9	Gravel.....	½	... 12	5 0 A.M.	Not.
... 13	7 0 P.M.	Weymouth Roads.....	8	Mud.....	½	... 15	7 30 A.M.	Not.
... 16	1 50 P.M.	Weymouth Roads.....	7½	Mud.....	½	... 16	3 0 P.M.	Not.
... 17	8 10 P.M.	Portland Roads.....	7	Mud and Gravel	1	... 18	9 0 A.M.	Not.
... 18	2 30 P.M.	Cowes Roads.....	8	Sand.....	1	... 22	1 0 P.M.	Not.
... 22	5 40 P.M.	Portland Roads.....	7	Mud.....	½	... 23	4 15 A.M.	Not.
... 23	7 20 P.M.	Portland Roads.....	8	Mud.....	½	... 24	4 40 A.M.	Not.
... 24	6 30 P.M.	Portland Roads.....	7½	Mud.....	1	... 26	6 30 A.M.	Not.
... 26	6 40 P.M.	Off South Yarmouth ...	16	Gravel.....	1	... 27	8 20 A.M.	Not.



under my command, has been brought up with the Block Anchor invented by  
 seen 27th February and 27th March, 1821, &c. &c. &c.

WHEN AT ANCHOR.		WHILE AT ANCHOR.			OTHER REMARKS.
Hour.	Drove or not.	Wind.	Weather.		
H. M.					
1 15 P.M.	Not.	E.	Feb. 27. P.M. Moderate; midnight, fresh breezes and squally.		Mar. 1. 1 P.M. Made sail; 1 <sup>h</sup> 15 <sup>m</sup> , weighed anchor; came home 19 fathoms cable out.
		E. & S.W.	... 28. A.M. Fresh breezes; noon, moderate; 12, fresh breezes and squally.		
		S.W.	Mar. 1. A.M. Fresh breezes; noon, fresh breezes and squally.		
9 0 A.M.	Not.	S.W.	... 1. P.M. Fresh breezes and squally; mid- night, moderate.		Mar. 6. 5 <sup>h</sup> 40 <sup>m</sup> A.M. Made sail and weighed anchor; came home 20 fathoms cable out, ground swell setting in.
		S.	... 2. A.M. Moderate.		
8 15 A.M.	Not.	S.W.	{ ... 2. P.M. Fresh breezes and squally. ... 3. A.M. Strong breezes.		
10 15 A.M.	Not.	S.W.	... 3. P.M. Fresh breezes and squally.		
		S.W.	... 4. A.M. Fresh breezes and squally; P.M. do.; 12, moderate.		
		E.N.E.	... 5. A.M. Moderate.		
5 40 A.M.	Not.	E. & S.E.	{ ... 5. P.M. 12, Fresh breezes. ... 6. A.M. Fresh breezes.		
5 30 P.M.	Not.	W.	{ ... 8. P.M. Strong breezes and squally. ... 9. Ditto weather.		
		W.	... 10. Fresh breezes. — Mar. 11. Moderate.		
5 0 A.M.	Not.	W.	..... Moderate.		
7 30 A.M.	Not.	N.E.	..... Moderate.		
3 0 P.M.	Not.	E.	..... Moderate.....		
9 0 A.M.	Not.	W.	..... Strong breezes and squally.....		Anchor held till up and down in weighing; blowing very hard.
1 0 P.M.	Not.	N.W.	{ ... 18. Strong breezes and squally. ... 19. Strong gales, with heavy squalls.		
		N.W.	{ ... 20. Strong gales, and squally. ... 22. A.M. Moderate; P.M. fresh breezes.		
4 15 A.M.	Not.	N.	..... Moderate.		March 27. 8 <sup>h</sup> 20 <sup>m</sup> A.M. Weighed anchor; came home 27 fms. cable out; foul bottom; considerable swell and lee tide.
4 40 A.M.	Not.	S.S.W.	..... Moderate.		
6 30 A.M.	Not.	W.	{ ... 24. P.M. Strong gales, and squally. ... 25. Fresh breezes.		
		N.W.	... 26. A.M. Moderate.		
8 20 A.M.	Not.	S.	... 26. 8 P.M. Strong breezes and squally.		
		W.	... 27. A.M. Strong gales, with heavy squalls.		

(Signed)

CHARLES BURRARD,  
*Commander.*

I therefore do not hesitate to give my opinion that this anchor has fully answered the intended purpose, as it would not, in all probability, be liable to a similar accident if used as a make-shift only; and I would beg leave most respectfully to state, that Lieutenant Rodger has presented to me a model of another block anchor of his invention, which appears to obviate every reasonable objection that can be made to the anchor under trial, not only as a make-shift, but as a permanent anchor,—another model of which, he acquaints me, was by him lodged in the Admiralty Office on the 24th of August last.

Lieutenant Rodger has been on board since the 8th ultimo; he has paid very particular attention to the make-shift anchor, and given every explanation required.

I am, Sir, &c. &c.

CHARLES BURRARD,  
*Captain.*

*Admiral Sir GEORGE CAMPBELL,*  
*K.C.B., &c. &c. &c.*